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Management of Tooth Extraction in Patients with Thalassemia

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Abstract

Introduction: Thalassemia is a congenital blood disorder in which the body produces faulty hemoglobin. This leads to persistent anemia and several systemic problems. Dental management is challenging, especially during tooth extraction, due to the increased risk of bleeding, susceptibility to infection, and potential complications related to transfusion and iron overload. This paper presents considerations and best practices for the safe extraction of teeth in patients with thalassemia.

Objective: To summarize and highlight effective management strategies for tooth extraction in patients diagnosed with thalassemia, emphasizing the minimization of complications and optimal healing.

Materials and Methods: This paper employs a systematic narrative review with content analysis based on scholarly papers from 2010 to 2026.

Results: Careful preoperative screening, including hematological evaluation and consultation with a hematologist, was critical for safe care. The use of local hemostatic agents, minimally invasive extraction procedures, and individualized antibiotic prophylaxis lowered the incidence of postoperative problems. Most of the patients had good recovery with an interdisciplinary approach and tailored care regimens.

Conclusion: With careful preoperative preparation, close interprofessional collaboration, and adherence to evidence-based guidelines, patients with thalassemia can undergo tooth extraction successfully. Regular communication among dentists, hematologists, and patients is necessary to ensure optimal outcomes and reduce the risk of thalassemia-related complications.

Keywords: Toothextraction; Management; Thalassemia; Patients; Dental Care

Introduction

Thalassemia is a quantitative defect in hemoglobin production caused by mutations in genes that encode alpha- or beta-globins. Unpaired globin chains are abnormal and damage the cell membrane, cause cell death within organ systems, and destroy erythroid precursors within the bone marrow, resulting in hemolytic anemia. The management of the general health effects of thalassemia is challenging throughout life, and the public health, financial, and personal burden of the condition is increased by neglect of dental and orthodontic complications. There is a dearth of evidence-based guidelines to inform care seekers and providers in the management of such dental complications [1].

The most prevalent is β-thalassemia major, the most severe form. Although β-thalassemia is prevalent worldwide, many dentists lack the skill to detect oral symptoms and deliver appropriate treatment. Patients may have trouble getting dental care. Patients may have several medical

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appointments, including blood transfusions, which can create cost and time constraints. Painful patients may seek emergency dental care. Dental decay is advanced, and infection and abscess may spread to the face and neck. Unfortunately, late presentation may result in more extractions than fillings, increasing tooth loss. Dentists may disregard and fail to communicate with hematology colleagues regarding the impact of β-thalassemia on dental care. Conversely, fear of the unknown may prevent improved dental care. General dentists sometimes refer patients to specialists or hospital-based dental departments for extractions [2].

A multidisciplinary approach involving hematologists, dentists, orthodontists, cardiologists, and others is needed to address this serious public health issue. The changes in the maxillofacial region caused by this genetic form of anemia require dental practitioners to understand the disorder, its effects on oral health, and how to treat patients with beta-thalassemia. The dentist needs a simpler grasp of the disease's physiopathology, systemic and orofacial symptoms, and superior dental techniques. Until medical research finds a cure for these disorders, whether through gene therapy or otherwise, these patients must be welcomed into the dental care cycle and given the best dental experience possible through teamwork [3].

Dental therapy may be carried out when the dentist does not fully understand the implications of β-thalassemia for dental management and thus does not communicate adequately with hematology colleagues. Conversely, fear of the unknown may be related to a reluctance to provide anything more than basic dental treatment. In fact, many general dentists may prefer to refer these patients to specialty dentistry services or hospital-based dental facilities, particularly when tooth extractions are required [4].

Although there is progress in the dental management of thalassemia patients, there is still a huge gap in the research on standardized protocols for tooth extraction in these patients. The available literature is mostly limited to single case reports or short case series and lacks major evidence-based research comparing alternative management techniques. Furthermore, there is insufficient guidance on the delivery of hematological care alongside dental interventions, especially in low-resource settings. This inconsistency highlights the need for specific clinical protocols and further research to establish best practices to ensure safety and optimal outcomes for patients with thalassemia who need tooth extraction.

Objective

This paper emphasizes efficient methods for managing tooth extraction in patients with thalassemia, aiming to reduce complications and promote healing.

Material and Methods

A systematic narrative review with content analysis is a method of literature review that combines the structured, rigorous search and selection process of a systematic review with the descriptive, qualitative synthesis typical of a narrative review. In this approach, researchers systematically identify, select, and evaluate relevant studies using predefined criteria to ensure comprehensiveness and minimize bias. Instead of focusing solely on statistical data or quantitative results, the review then employs content analysis, a qualitative technique, to categorize and interpret key themes, patterns, and concepts across the collected literature. This method is especially useful for topics where studies may be heterogeneous or where quantitative synthesis (meta-analysis) is not feasible. The result is a thorough, organized summary of existing knowledge that highlights trends, gaps, and implications in the research area [5,6].

The researcher conducted a systematic narrative review with content analysis to synthesize and evaluate the current literature on the management of tooth extraction in patients with thalassemia. Keywords such as "thalassemia," "tooth extraction," "dental surgery," and "management strategies" were used to search the electronic medical databases (PubMed, Scopus, Web of Science) to select the articles. Studies were assessed for relevance and quality against pre-specified inclusion and exclusion criteria. The extracted data were analyzed using content analysis, which identified recurring themes, effective interventions, and gaps in clinical practice. The review identified a spectrum of management strategies, including hematologic optimization, local hemostatic procedures, and multidisciplinary care models. It highlighted the lack of defined protocols and detailed guidelines. This comprehensive approach provided a nuanced understanding of current methods and informed suggestions to improve safety and results of dental extractions in patients with thalassemia. This paper employs a systematic narrative review and content analysis. Scholarly papers mainly in 2020 to 2026 were selected based on related topics and keywords.

The inclusion criteria for this review on the management of tooth extraction in patients with thalassemia were studies of human subjects with any type of thalassemia who underwent tooth extraction; articles describing preoperative, intraoperative, or postoperative management strategies; and English-language, peer-reviewed journal publications. We reviewed observational and interventional studies, as well as systematic reviews, on dental management in thalassemia. Studies on dental procedures other than extraction, non-thalassemia populations, case reports, editorials, conference

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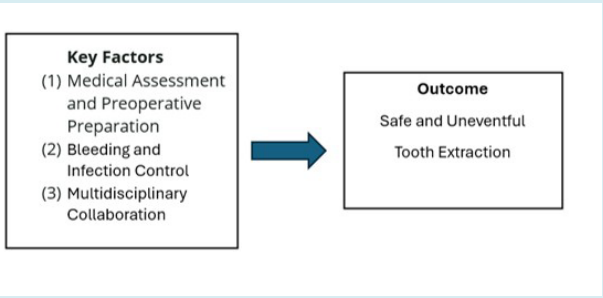
abstracts without complete data, and articles missing sufficient Methodological details or publications in languages other than English were excluded. These criteria ensured the review was bounded by high-quality, relevant evidence directly applicable to clinical practice.

Results



Source: Author's elaboration
Figure 1: Conceptual Framework

According to Kalbassi et al. [7-15], it could be summarized as follows; Thalassemia is an inherited blood disorder. People suffering from this disease are unable to produce enough hemoglobin, leading to severe anemia. In persons with alpha thalassemia, the hemoglobin lacks adequate alpha protein. Many regions of the body lack adequate oxygen in beta thalassemia due to low hemoglobin levels. The thalassemia intermediate phenotype is defined as one that presents later than thalassemia major, with milder anemia and infrequent transfusion requirements. Thalassemia is caused by inheriting abnormal and mutated genes from the parents involved in the production of hemoglobin. If one of the parents is a carrier for thalassemia, the child may become a carrier of the disease, although the child will not have any symptoms. High quantities of iron can cause harm to the heart, liver, and endocrine system. The only way to prevent major complications is to know the parents' thalassemia status before the child is conceived. If both parents are found to be positive for the carrier state, they should be counseled for prenatal diagnosis in the first trimester of pregnancy for identification of whether the index fetus is afflicted or not. Affected Medical Termination is advised to the couple. A team of different healthcare professionals working together in a specialist thalassemia center will support children and adults with the condition. Chelation therapy is the process of removing excess iron from the blood of patients receiving regular blood transfusions. This is very important as too much iron in the body can damage the organs. The sole treatment for thalassemia is a stem cell or bone marrow transplant; however, these are not done very often because of the hazards involved.

Thalassemia major causes a range of signs, symptoms, and complications. The following conclusions can be taken from the existing data:

- Few thalassemic subjects were free of periodontal disease symptoms.
- The most common orofacial complications of thalassemia major were frontal bossing and saddle nose, followed by dental and jaw pain, discolored teeth, pallor of the oral mucosa, headache, and maxillary protrusion.
- Nasal airway problems and lower lip paresthesia were reported by some patients.
- Radiologic study showed that the frontal bone was thickened, the mandibular cortex was thin, and the ramus dimensions were reduced in most of the patients. Faint lamina dura and tiny maxillary sinuses were observed in 37.5-42.4% of enlarged marrow spaces.
- Increasing age was related to greater manifestations of thalassemia major. Early diagnosis and management result in a better prognosis and reduce complications.

A dental-health-monitoring program in Iran that aims to increase dental health in both patients and normal children could integrate preventive and early-stage orthodontic evaluation, with more emphasis on those afflicted children who have diseases that threaten their dental health. Regular blood transfusion and monitoring of hemoglobin levels in these patients is a crucial measure to increase life expectancy and decrease the associated complications, which otherwise might be reversed in a poorly equipped environment with a lack of proper monitoring programs.

The following are recommended before starting treatment: 1) major, mild, or intermedia thalassemia, 2) patient hemoglobin level, and 3) iron overload. Repeated transfusions raise body iron burden, causing difficulties; thus, monitor iron overload periodically: 1) relative organ involvement with iron, 2) chelators given to the patient (transfused patients need chelation therapy to eliminate excess iron), and 3) splenomegaly. Splenectomy may be recommended if hypersplenism is associated with leucopenia and thrombocytopenia, 4) splenectomy history, and 5) patient prognosis and life expectancy. Dental issues exist for thalassemia. A thalassemia patient should undergo any invasive treatment under antibiotics and promptly after transfusion. Patients should have liver function and coagulation tests before dental operations. Orthodontic treatment can align teeth after surgery for orofacial defects and malocclusions in less severe thalassemia. Early orthodontic treatment can correct mild malocclusions. Hepatotoxic drugs should be prescribed cautiously. Avoid tetracycline, metronidazole, and erythromycin estolate. Paracetamol is safer than NSAIDS and aspirin. Sedation

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or anesthesia may improve dental cooperation among patients with thalassemia. Patients with thalassemia should be cautious owing to immune, hepatic, splenectomy, and cardiovascular concerns. Dental surgeons, hematologists, and orthodontists should collaborate.

Discussions

This article discusses three themes as follows;

Medical Assessment and Preoperative Preparation Affecting Safe and Uneventful Tooth Extraction

A thorough medical assessment and adequate pre-operative preparation are essential for a safe and uneventful extraction of teeth in patients with thalassemia. This process begins with a thorough medical history and evaluation of the patient's hematologic status, including hemoglobin, platelet count, and coagulation profile, as well as evaluation for organ complications related to chronic anemia or iron overload. Cooperation with a hematologist is needed to optimize the patient's systemic status, which may include blood transfusions or particular drugs to treat deficiencies or coagulopathies before surgery. Other issues to address include looking for infection, monitoring the patient's immunological status, and arranging for antibiotic prophylaxis if required. By addressing these concerns prior to extraction, the likelihood of intra-operative and post-operative problems can be greatly reduced, enabling a smooth and successful recovery.

Bleeding and Infection Control Affecting Safe and Uneventful Tooth Extraction

In patients with thalassemia, who have a tendency to bleed easily and a higher risk of infection due to their blood condition, bleeding and infection control are essential to safe and uneventful tooth extraction. Intraoperatively, local hemostatic agents, careful surgical technique, and primary wound closure with sutures can significantly reduce bleeding. Any coagulopathy is further minimized by correcting it preoperatively with blood transfusions or particular drugs as needed to reduce the risk of excessive hemorrhage. To prevent postoperative infections, rigorous adherence to aseptic standards during surgery and the administration of prophylactic antibiotics are recommended, particularly in immunocompromised or splenectomized patients. Close postoperative monitoring and clear instructions to the patient on oral hygiene and wound management facilitate early recognition and prompt management of any complications and thus support optimal healing and recovery.

Multidisciplinary Collaboration Affecting Safe and Uneventful Tooth Extraction

Multidisciplinary teamwork and the integration of skills from hematology, dentistry, anesthesia, and nursing are necessary for safe and uneventful tooth extraction in patients with thalassemia. Good communication between dental surgeons and hematologists permits individual preoperative planning including optimization of hematological status and management of potential complications such as bleeding or infection. Nurses provide perioperative care and education to patients that is key to compliance and recovery. This team approach includes complete assessment, coordinated management, and ongoing monitoring, which ultimately minimize risks and optimize outcomes for thalassemia patients requiring teeth extractions.

Conclusion

Despite the complexities of managing tooth extraction in patients with thalassemia, the lack of standardized protocols still poses a significant challenge in clinical practice. Management tactics are diverse, and there is no consensus with regard to the appropriate preoperative evaluation, intraoperative techniques, and postoperative care of patients with thalassemia. This is further complicated by the lack of integration of hematological expertise into dental care, particularly in resource-limited settings, where multidisciplinary teams and advanced supportive therapies may be limited. Often, in the absence of clear evidence-based guidelines, practitioners rely on their own experience or general recommendations that may not account for the specific risks of thalassemia, such as increased bleeding tendency, susceptibility to infection, and complications related to iron overload or transfusion requirements. Therefore, there is an urgent need for comprehensive clinical guidelines to address the specific needs of this patient population, supported by robust research that compares management strategies and informs the development of best practices. Bridging these gaps will improve the safety and optimal outcomes for thalassemia patients requiring tooth extraction and ultimately enhance the quality of their care worldwide. Tooth extraction in patients with thalassemia requires effective management, including preoperative evaluation, interdisciplinary collaboration, and minimally invasive surgical procedures. A hematological evaluation before extraction and close collaboration with a hematologist to optimize hemoglobin and coagulopathies is required. Local hemostatic techniques include the administration of absorbable hemostatic drugs; suturing and the application of pressure are useful for reducing bleeding during and after the procedure. Prophylactic antibiotics can be administered to reduce the risk of infection, especially

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in the immunocompromised. Close monitoring and clear instructions on oral hygiene and wound care are necessary for postoperative management to ensure proper healing and avoid complications. The application of these strategies can help clinicians to reduce the risks of thalassemia and improve the safety and predictability of dental extractions in this vulnerable population.

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